



U.S. Department of Commerce
BUREAU OF THE CENSUS
INDUSTRY AND TRADE ADMINISTRATION



Titanium Ingot, Mill Products, and Castings

SUMMARY FOR 1987

ITA991(87)-5
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SUMMARY OF FINDINGS

In 1987, the production of titanium ingot totaled 74.4 million pounds, an increase of 10 percent from the 70.2 million pounds in 1986. Also, the consumption of ingot in 1987 increased 5 percent from the 67.6 million pounds reported in 1986, to 71.1 million pounds. For 1987, the net shipments of mill products totaled 44.6 million pounds, a 7-percent increase from the 1986 figure of 41.7 million

pounds. Casting shipments totaled 949 thousand pounds which was a 12-percent increase over the 849 thousand pounds reported in 1986.

The statistics in this publication are based on a survey of manufacturers and represents the total U.S. shipment of titanium ingot mill products and castings. Estimates are included for companies whose reports were not received in time for tabulation. A description of the survey methodology and related information appears on page 4.

Table 1. NET SHIPMENTS OF TITANIUM MILL PRODUCTS: 1987 AND 1986

(Thousands of pounds)

| Product description | Total | | First quarter | | Second quarter | | Third quarter | | Fourth quarter | |
|-----------------------------------|---------------|--------------|---------------|--------------|----------------|--------------|---------------|--------------|----------------|--------------|
| | Net shipments | Inven-tories | Net shipments | Inven-tories | Net shipments | Inven-tories | Net shipments | Inven-tories | Net shipments | Inven-tories |
| 1987 | | | | | | | | | | |
| Total ¹ | 44,572 | (X) | 11,007 | 896 | 11,775 | 933 | 10,503 | 997 | 11,287 | 1,002 |
| Sheet and strip..... | (2) | (2) | (2) | (2) | (2) | (2) | (2) | (2) | (2) | (2) |
| Plate..... | | | | | | | | | | |
| Forging and extrusion billet..... | 24,181 | (X) | 6,051 | 344 | 6,362 | 356 | 5,646 | 410 | 6,122 | 449 |
| Rod and bar..... | 6,464 | (X) | 1,489 | 359 | 1,637 | 381 | 1,687 | 327 | 1,651 | 317 |
| Fastener stock and wire..... | 13,927 | (X) | 3,467 | 193 | 3,776 | 196 | 3,170 | 260 | 3,514 | 236 |
| Extrusion..... | | | | | | | | | | |
| Pipe and tubing..... | | | | | | | | | | |
| Other..... | | | | | | | | | | |
| 1986 | | | | | | | | | | |
| Total ¹ | 41,682 | (X) | 11,130 | 1,353 | 10,291 | 1,550 | 10,391 | 1,214 | 9,870 | 1,029 |
| Sheet and strip..... | (2) | (2) | (2) | (2) | (2) | (2) | (2) | (2) | (2) | (2) |
| Plate..... | | | | | | | | | | |
| Forging and extrusion billet..... | 21,244 | (X) | 5,986 | 473 | 5,132 | 430 | 5,196 | 390 | 4,930 | 278 |
| Rod and bar..... | 6,022 | (X) | 1,413 | 658 | 1,725 | 836 | 1,320 | 591 | 1,564 | 567 |
| Fastener stock and wire..... | 14,416 | (X) | 3,731 | 222 | 3,434 | 284 | 3,875 | 233 | 3,376 | 184 |
| Extrusion..... | | | | | | | | | | |
| Pipe and tubing..... | | | | | | | | | | |
| Other..... | | | | | | | | | | |

(X) Not applicable.

¹Net shipments is the sum of mill product shipments plus mill products consumed in the manufacture of fabricated products, less total receipts.

²Data for sheet and strip, plate, extrusion (other than tubing), pipe and tubing, and other have been combined to avoid disclosing individual company data.

Table 2. TITANIUM INGOT, MILL PRODUCTS, AND CASTINGS: 1987 AND 1986

(Thousands of pounds)

| Quarter and year | Ingot | | | | | Mill products | | | Castings | |
|--------------------------|----------------------|---------------|----------------|------------------|-----------------------|----------------------|---------------|---------------------------------|----------------------|----------------|
| | Pro- duc- tion | Recei- pts | Ship- ments | Con- sumption | Ending inventories | Pro- duc- tion | Recei- pts | Net ship- ments ¹ | Pro- duc- tion | Ship- ments |
| 1987 | | | | | | | | | | |
| Total ² | 74,432 | 16,605 | 19,223 | 71,122 | (X) | 52,537 | 10,080 | 44,572 | 2,915 | 949 |
| Fourth quarter..... | 19,681 | 3,683 | 5,275 | 16,458 | 8,917 | 13,340 | 2,342 | 11,287 | 802 | 278 |
| Third quarter..... | 18,822 | 4,774 | 4,478 | 18,820 | 7,340 | 12,601 | 2,318 | 10,503 | 754 | 239 |
| Second quarter..... | 18,170 | 4,014 | 5,229 | 17,938 | 7,042 | 13,965 | 2,849 | 11,775 | 727 | 221 |
| First quarter..... | 17,759 | 4,134 | 4,241 | 17,906 | 7,901 | 12,631 | 2,571 | 11,007 | 632 | 211 |
| 1986 | | | | | | | | | | |
| Total ² | 70,186 | 15,270 | 18,033 | 67,603 | (X) | 49,219 | 10,635 | 41,682 | 2,210 | 849 |
| Fourth quarter..... | 16,685 | 3,287 | 4,075 | 15,910 | 8,197 | 11,968 | 2,452 | 9,870 | 600 | 205 |
| Third quarter..... | 16,342 | 3,458 | 4,140 | 16,550 | 8,229 | 12,410 | 2,528 | 10,391 | 489 | 194 |
| Second quarter..... | 18,097 | 3,872 | 4,203 | 17,090 | 9,171 | 12,485 | 2,804 | 10,291 | 549 | 207 |
| First quarter..... | 19,062 | 4,653 | 5,615 | 18,053 | 8,491 | 12,356 | 2,851 | 11,130 | 572 | 243 |

(X) Not applicable.

¹See footnote 1, table 1.²Inventories for the year are those shown for the fourth quarter.

Table 3. NET SHIPMENTS, EXPORTS, IMPORTS, AND APPARENT CONSUMPTION OF TITANIUM INGOT, MILL PRODUCTS, AND CASTINGS: 1987 AND 1986

(Quantity in thousands of pounds)

| Product description | Manufacturers' net shipments | Exports of domestic merchandise ^{1,2} | Percent exports to manufacturers' net shipments | Imports for consumption ³ | Apparent consumption ⁴ | Percent imports to apparent consumption |
|--|------------------------------|--|---|--------------------------------------|-----------------------------------|---|
| 1987 | | | | | | |
| Total..... | 63,795 | 9,850 | 15 | 1,981 | 55,926 | 4 |
| Titanium ingot and forging and extrusion billet ⁵ | 43,404 | 5,880 | 14 | 91 | 37,615 | (2) |
| Titanium mill products..... | 20,391 | 3,970 | 19 | 1,890 | 18,311 | 10 |
| FOURTH QUARTER | | | | | | |
| Total..... | 16,562 | 2,676 | 16 | 521 | 14,407 | 4 |
| Titanium ingot and forging and extrusion billet ⁵ | 11,397 | 1,764 | 15 | 18 | 9,651 | (2) |
| Titanium mill products..... | 5,165 | 912 | 18 | 503 | 4,756 | 11 |
| THIRD QUARTER | | | | | | |
| Total..... | 14,981 | 2,602 | 17 | 497 | 12,876 | 4 |
| Titanium ingot and forging and extrusion billet ⁵ | 10,124 | 1,324 | 13 | 25 | 8,825 | (2) |
| Titanium mill products..... | 4,857 | 1,278 | 26 | 472 | 4,051 | 12 |
| SECOND QUARTER | | | | | | |
| Total..... | 17,004 | 2,402 | 14 | 557 | 15,159 | 4 |
| Titanium ingot and forging and extrusion billet ⁵ | 11,591 | 1,463 | 13 | 29 | 10,157 | (2) |
| Titanium mill products..... | 5,413 | 939 | 17 | 528 | 5,002 | 11 |
| FIRST QUARTER | | | | | | |
| Total..... | 15,248 | 2,170 | 14 | 406 | 13,484 | 3 |
| Titanium ingot and forging and extrusion billet ⁵ | 10,292 | 1,329 | 13 | 19 | 8,982 | (2) |
| Titanium mill products..... | 4,956 | 841 | 17 | 387 | 4,502 | 9 |
| 1986 | | | | | | |
| Total..... | 59,715 | 6,502 | 11 | 2,691 | 55,904 | 5 |
| Titanium ingot and forging and extrusion billet ⁵ | 39,276 | 4,238 | 11 | 213 | 55,251 | 1 |
| Titanium mill products..... | 20,439 | 2,264 | 11 | 2,478 | 20,653 | 12 |
| FOURTH QUARTER | | | | | | |
| Total..... | 13,945 | 1,479 | 11 | 536 | 13,002 | 4 |
| Titanium ingot and forging and extrusion billet ⁵ | 9,005 | 904 | 10 | 37 | 8,138 | 1 |
| Titanium mill products..... | 4,940 | 575 | 12 | 499 | 4,864 | 10 |
| THIRD QUARTER | | | | | | |
| Total..... | 14,531 | 1,846 | 13 | 563 | 13,248 | 4 |
| Titanium ingot and forging and extrusion billet ⁵ | 9,336 | 1,267 | 14 | 32 | 8,101 | (2) |
| Titanium mill products..... | 5,195 | 579 | 11 | 531 | 5,147 | 10 |
| SECOND QUARTER | | | | | | |
| Total..... | 14,494 | 1,969 | 14 | 790 | 13,315 | 6 |
| Titanium ingot and forging and extrusion billet ⁵ | 9,335 | 1,373 | 15 | 43 | 8,005 | 1 |
| Titanium mill products..... | 5,159 | 596 | 12 | 747 | 5,310 | 14 |
| FIRST QUARTER | | | | | | |
| Total..... | 16,745 | 1,208 | 7 | 802 | 16,339 | 5 |
| Titanium ingot and forging and extrusion billet ⁵ | 11,600 | 694 | 6 | 101 | 11,007 | 1 |
| Titanium mill products..... | 5,145 | 514 | 10 | 701 | 5,332 | 13 |

(Z) Less than one-half of 1 percent.

¹For comparison of Standard Industrial Classification (SIC) codes, Schedule B export numbers, and TSUSA import numbers, see table 4.²Source: Bureau of the Census report FT446, U.S. Exports.³Source: Bureau of the Census report FT246, U.S. Imports for Consumption.⁴Apparent consumption is derived by subtracting exports from the total of net shipments plus imports.⁵Comparability of output, export, and import classifications for ingot and billet assume that blown, sheet bar, and slab are reported as ingot or billet in the output codes. Figures for imports of ingot and billet also include powder, crystal, and similar forms which are excluded from the output and export codes.

Table 4. COMPARISON OF STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODES, SCHEDULE B EXPORT NUMBERS, AND TSUSA IMPORT NUMBERS

| Product code | Product description | Export number | Product description | Import number | Product description |
|-----------------------|---|---------------|---|---------------|---|
| 33562 74 ¹ | Titanium ingot and forging and extrusion billet | 630-6520 | Titanium ingots, billets blooms, sheet bars, and slabs | 2629-1460 | Unwrought titanium metal, except sponge |
| 33562 79 | Titanium mill products | 630-6570 | Wrought titanium metal including alloys (excludes sponge ingots, billets blooms, sheet bars, slab, waste and scrap) | 629-2000 | Wrought titanium metal, including alloys (excludes waste, scrap, and unwrought metal) |

¹Comparability of output, export, and import classification for ingot and billet assume that bloom, sheet bar, and slab are reported as ingot or billet in the output numbers.²Figures for imports of ingot and billet also include powder crystals and similar primary forms which are excluded from the output and export numbers.

DESCRIPTION OF SURVEY

Scope of Survey. This survey covers companies engaged in producing titanium ingot, mill products, and castings.

Survey Methodology. The statistics in this publication are collected by mail on Bureau of the Census quarterly Form ITA991, Titanium Metal. The panel for this survey includes all known producers of titanium ingot, mill products, and castings, approximately 48 companies.

Survey Error. Figures for the current quarter include estimates for panel members for which reports were not received in time for tabulation. Such missing figures are "imputed" based on quarter-to-quarter movements shown by reporting firms. Imputation generally is limited to a maximum of 10 percent for any one data cell. Figures with imputation rates greater than 10 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse because the actual quarterly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is not precisely known but is assumed to be small. The degree of uncertainty regarding the accuracy of the published data, however, increases as the percentage of imputation increases. Figures with imputation rates above 10 percent should be used with caution.

Revisions to Previous Period Data. Data may be revised as the result of corrected figures received from respondents or other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

EXPLANATION OF TERMS

Gross Shipments of Mill Products. Represents mill shapes shipped between producers plus mill shapes consumed in the production of fabricated products such as forgings.

Net Shipments of Mill Products. Represents gross shipments less receipts. For detail categories, net shipments also includes consumption in the manufacture of other mill shapes.

Sheet and Strip. Flat roll mill products with thickness less than or equal to .187 inch.

Plate. Flat roll mill products with thickness exceeding .187 inch and greater than 10 inches wide.

Forging and Extrusion Billet. Rounds, squares, and rectangles with a cross-sectional area greater than or equal to 16 square inches and width less than 5 times thickness.

Rod and Bar. Rounds greater than 1/2 inch diameter and less than or equal to 4 1/2 inches in diameter. Squares with cross-sections less than 16 square inches. Rectangles with widths less than or equal to 10 inches and thickness less than 3/16 and cross-sectional area less than 16 inches square.

Fastener Stock and Wire. Rounds with diameter less than or equal to 1/2 inch.

Extrusions (Other Than Tubing). Any product of any shape, except pipe and tubing, produced by forcing heated metal through a die.

Pipe and Tubing. All seamless and welded pipe and tubing.

Ingot. Includes direct casting of extrusion billet and other similar products.

Stocks. Equal to the end of the prior period plus production and receipts for the current period, minus consumption and shipments.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; on the other hand, the export and import classification system is more materials oriented. Also, there are a substantial number of imported commodities which have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to the problems mentioned above, there are also the following problems affecting the comparability of the three sets of data.

Valuation. There are different methods of valuation for the three types of data:

- **Domestic Output.** Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

- **Exports.** Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance and other charges to the export point.

Estimated producers' values of exports have also been developed. These values more closely approximate the values reported for domestic output because they exclude freight, insurance, and other charges applied from the producing plant to the export point.

- **Imports.** Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

Duplication in Quantity and Value of Output. Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

Low-Value Import and Export Transactions. Detailed commodity information is not included for individual export shipments valued at not more than \$1,500. Generally, detailed commodity information is not included for individual import shipments valued at more than \$1,000. For textiles and textile products, gloves, footwear, and miscellaneous rubber and plastics products, detailed commodity information is not included for individual import shipments valued at not more than \$250. This is believed to have only negligible effects on the statistics for the bulk of the commodities.

Manufacturers' Shipments, Not Specified by Kind. The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

Time Lag Between Output and Exports. There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

"Direct" vs "Total" Commodity Exports and Imports. Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

Used Commodities. With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

Geographic Area of Coverage. Import and export data reflect the movement of merchandise into and out of U.S. foreign trade zones, the U.S. Virgin Islands, and the U.S. customs territory (includes the 50 States, the District of Columbia, and Puerto Rico).

HISTORICAL NOTE

Data on titanium metal have been collected by the Bureau of the Census since 1955. Historical data may be obtained from Current Industrial Reports (called Facts for Industry before 1959) available at your local Federal Depository Library. A list of these libraries may be obtained from the Bureau of the Census regional offices:

| Office | Telephone |
|----------------------------|----------------|
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| Detroit, Michigan | (313) 226-7742 |
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| Philadelphia, Pennsylvania | (215) 597-4920 |
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Historical data are also available on microfiche. For further information contact the Bureau of the Census, Data User Services Division (301) 763-4100.

RELATED REPORTS

A quarterly Current Industrial Report also is published in this series. The Bureau of the Census publishes the following related reports:

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CONTACTS FOR DATA USERS

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| Current Industrial Report ITA991 | Mary Ellickson | (301) 763-2529 |
| Manufacturers' Shipments, Inventories, and Orders | Ruth Runyan | (301) 763-2502 |

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